in the computation. No hypothesis is introduced into the process, and therefore no correction of error by trial is requisite.

Of three methods proposed, one combines the advantages of Keill's series and Cassini's approximation together, and is regarded by the author as the most simple in theory, and most expeditious in practice, which has yet been proposed.

Demonstrations of the late Dr. Maskelyne's *Formulæ for finding the Longitude and Latitude of a celestial Object from its Right Ascension and Declination; and for finding its Right Ascension and Declination from its Longitude and Latitude, the obliquity of the Ecliptic being given in both cases. By the Rev.* Abram Robertson, *D.D. F.R.S. Savilian Professor of Astronomy in the University of Oxford, and Radcliffian Observer. Communicated by the Right Hon. Sir* Joseph Banks, *Bart. G.C.B. P.R.S.* Read February 15, 1816. [*Phil. Trans.* 1816, *p.* 138.]

Dr. Robertson conceives that no full demonstration of these formulæ has yet been published; and hence no one has hitherto remarked two oversights with respect to their application to certain particular cases, which had escaped the notice of their author. Their value, however, has been duly appreciated by those most competent to judge of their merit, especially by M. Delambre, who remarks upon their conciseness, as well as precision, in comparison even with the formulæ given by Lalande.

Some Account of the Feet of those Animals whose progressive Motion can be carried on in opposition to Gravity. By Sir Everard Home, *Bart. V.P.R.S.* Read February 22, 1816. [*Phil. Trans.* 1816, *p.* 149.]

The power which flies have of crawling upon a ceiling is well known, but the mode in which this is effected, says the author, has never been explained. It was not till lately he learned that there are animals of a larger size which have the same power, and in which, from their size, the construction of their feet will admit of more accurate examination.

The *Lacerta Gecko* of Java walks up and down the smoothly polished chinam walls in quest of flies, and runs upwards to its retreat in the roofs of the houses, although the weight of a specimen given to the author by Sir Joseph Banks was as much as $5\frac{3}{4}$ ounces.

On the feet of this animal are five toes, armed with a very sharp and curved claw; and there are also on each sixteen transverse slits, with serrated edges, with pouches between them, which are considered by the author as the striking peculiarity in the foot of this lizard. When these are closed, the under surface of the foot bears a considerable resemblance to the upper part of the head of the sucking fish, the surface of which is furnished with two rows of moveable plates attached by one edge, and serrated at the other, and

its margin is surrounded by a broad loose membrane, capable of very close application to any surface on which it is placed.

By elevation of the plates, a degree of exhaustion is thus occasioned; and the fish thereby firmly attaches himself to the shark, or to any other object.

In the same manner it would appear that the transverse serratures of the bottom of the toes of the lizard, by their elevation, occasion a degree of exhaustion or partial vacuum, confined by the broad membrane which is attached all round each of the toes.

The author is of opinion, that the feet of the common fly act upon the same principle. Their under surfaces, when highly magnified, appear to be concave, as they are represented by Kellar; and he thinks it cannot be doubted that these cavities are employed to rarify the air between them and the surfaces to which they are applied, and thus support the weight of the fly, in opposition to gravity, when suspended from a ceiling.

On the Communication of the Structure of doubly-refracting Crystals to Glass, Muriate of Soda, Fluor Spar, and other Substances, by mechanical Compression and Dilatation. *By* David Brewster, *LL.D. F.R.S. Lond. and Edin.* *In a Letter addressed to the Right Hon. Sir* Joseph Banks, *Bart. G.C.B. P.R.S.* Read February 29, 1816. [*Phil. Trans.* 1816, *p.* 156.]

The subjects here chosen for experiment are such bodies as have in general no power of polarizing or depolarizing light, and the means employed for communicating these properties are purely mechanical. In the first instance, a piece of plate-glass was taken, and compressed edge-wise between two screws, and was found to polarize light in every part of its breadth, with depolarizing axes, making an angle of 45° with the edges of the plate.

When a narrow slip of plate-glass is attempted to be bent edge-wise, the inner edge becomes compressed sufficiently to produce the effect of depolarization; and the exterior edge of the curve, by being dilated, also depolarizes: but the characters of the fringes of colour produced in the two cases are different; since those which arise from compression are such as are produced by calcareous spar and beryl; but those caused by dilatation of the exterior edge are such as appear from the action of sulphate of lime, quartz, and other bodies of that class.

The author observes, that the tints polarized ascend in Newton's scale, in proportion as the forces of compression or dilatation are increased.

When two plates under a state of compression are combined transversely, the same phenomena are exhibited as by means of a plate formed of a doubly-refracting crystal.

The effect of two plates of compressed glass, similarly placed, is the same as that of a double plate; but if they be placed transversely, then the tints are such as are due to the difference of their thick-